



VISION SENSOR

CS-52

LICENSING MODEL
QUICK START GUIDE

OUR COMPACT MODEL. THE CS-52 VISION SENSOR.

ALSO FOR MORE CHALLENGING APPLICATIONS.

The CS-52 Vision sensor impresses with its powerful, upgradeable software, clever and robust illumination concept. Thanks to high-performance image processing tools and the quickly configurable nVision-i software, optimal performance and smooth startup is guaranteed.



Supported industry protocols
Digital I/O, TCP/IP, Profinet, FTP/SFTP, Profinet and Ethernet/IP

Four focal lengths available
To meet all standard application requirements at short and medium working distances

Built-in white LED lighting
Optimal commissioning via software-controlled lighting.

Simple, seamless integration
Thanks to user-friendly, intuitive software and high-performance image processing tools

Image correction and calibration
For improving image quality and conversion of pixel values to real values (mm)

Upgrade function
The ID PRO, OCR and SMART upgrades are available through a simple licensing model.

Robust, compact housing with IP50
Protected against dust

First steps	4	The image processing tools	8	User interface	12
Unboxing	4	Localization	8	Structure of the user interface	12
Installing the nVision-i software:	4	Detection	9	Communication with higher-level control systems	13
Licensing	5	Counting	9	Saving the job	13
Upgrade	5	Optional upgrade modules	10	Executing the job	13
FAQs	5	Measurement	10	Appendices	14
Adjusting the settings of the CS-52	6	ID	11	Renaming inspection tools	14
Adjusting the focus	7	ID Pro	11	Renaming a job name	14
		OCR	11	Setting a boot job	15
		OCV	11	Importing and exporting the job	15
				Technical data	16

LICENSING MODELS FOR CS-52

I License for nVision-i Parameterization software

- Item 213438 nVision-i
- Creation of offline jobs
- Parameterization of sensor
- Available through the online shop, customer service or with a delivered sensor *
- Free

* The license key for the nVision-i configuration software is included on the delivery note with every sensor shipped.

II Upgrade License Functional enhancement

- 213364: CS60-UP-ID-LICENSE
- 213770: CS60-UP-ID-PRO-LICENSE
- 213365: CS60-UP-MEAS-LICENSE
- 214845: UP-OCR-LICENSE
- 215249: UP-SMART
- The licenses are used to activate functions on the sensor.
- Fee-based

III Variants Fully licensed and available from stock

CS-52 Vision sensors are available with

- Resolution:
1440 (H) × 1080 (V)
2064 (H) × 1552 (V)
- Focal length:
3.6 mm
8 mm
16 mm
25 mm

PROCESSES FOR LICENSING MODELS

I License for nVision-i Parameterization software

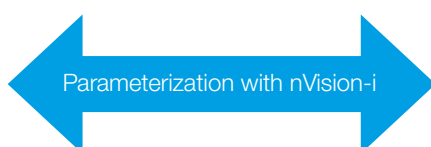
1. The nVision-i software can be downloaded from the online shop.
2. The license is activated automatically when the software is started for the first time.
3. If there is no Internet connection, di-soric Customer Service can activate the license manually.

II Upgrade License Functional enhancement

1. A CS-52 is already present.
2. To complete a new task, an expanded functional scope is required.
3. The upgrade can be acquired via the online shop or via di-soric Customer Service. The sensor serial number is required for this.

III CD-52 Variants Fully licensed and available from stock

1. The CS-52 is acquired via the online shop or Customer Service.
2. Off the shelf, the sensor has the license setup uploaded to it and has the ordered status upon delivery.



FIRST STEPS

Unboxing



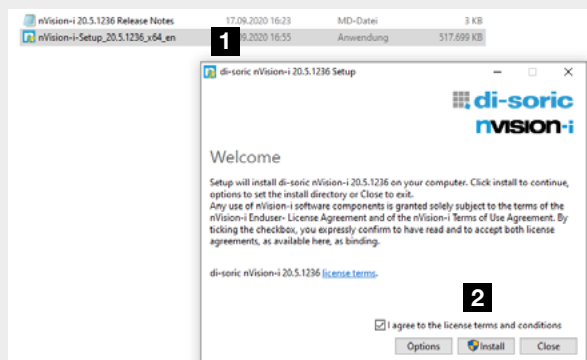
Every sensor shipped comes with the license key for the nVision-i configuration software on the delivery note.

1. Unpack the CS-52, mechanically assemble it and complete electrical wiring according to instructions.
2. Connect the M12 plug end (8-pin) of the Ethernet connection cable to the M12-X socket on the sensor.
3. Connect the RJ45 end of the Ethernet connection cable to the RJ45 interface of the client PC (PC is only required for setup) or the PLC.
4. Connect the sensor to the power supply. To do this, PWR, GND, Trigger and I/O must be properly connected. The power supply must be between 18 and 30 V DC. Caution: It must be ensured that both ends of the cable are firmly and correctly attached to establish a physical connection.
5. Connect the M12 connector (12-pin) of the IO-PWR cable to the free M12 socket (12-pin) of the sensor.

Note:

- Each CS-52 is delivered with a standard, fixed IP address IP: 192.168.3.15/subnet mask: 255.255.255.0 and the device name "CS-52". To avoid network interference, it must be ensured in advance that each IP address is unique within the network!
- The sensor and PC must be in the same IP address range for them to be able to be connected.
- Preferably, use static IP addresses in the network in order to ensure a stable connection.
- If several CS-52 Vision sensors are to be used simultaneously, the IP addresses must be adjusted in order to prevent network conflicts.

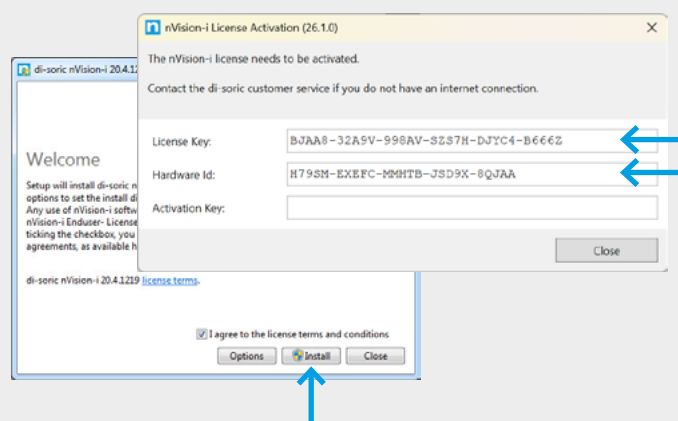
Installing the nVision-i software:



- The latest software version is available for download on the di-soric homepage at <https://www.di-soric.com/213438>. To ensure that the nVision-i software is installed properly, full administrative rights are required!
- Start installation by clicking on "Install". Perform the installation steps on the screen according to the instructions on the screen. At the end of a successful installation, a confirmation notice is displayed. The computer may have to be restarted.

Fig. 01

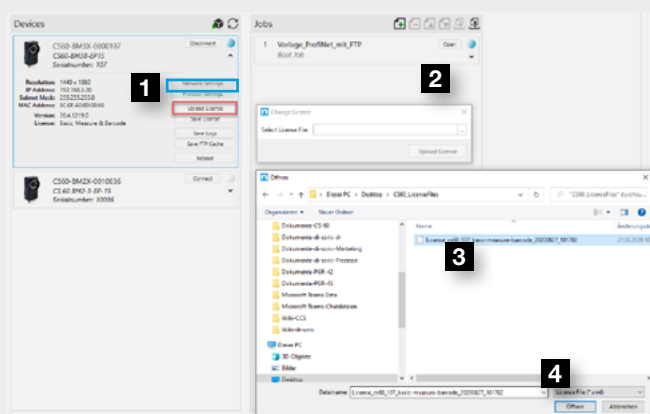
Licensing



The license is activated the first time nVision-i is started. If licensing is successful, nVision-i can be started.

If the computer being used does not have an Internet connection, the software can also be activated by our Customer Service. Please contact service@di-soric.com with a screenshot of the license activation dialog

Upgrade



- 1 Start nVision-i and open up the Parameter menu of the sensor.
- 2 Open file explorer by way of the "Upload license" entry.
- 3 Select the license file in the file explorer.
- 4 Upload the file with "Open".

FAQs

Even with a functioning Internet connection, retrieval of the license file is not possible.

Cause: All app access to the Internet is blocked by Customer IT as a rule.

Solution: Simply perform the installation as described above without Internet access.

After the installation, the connected sensors are not recognized.

Cause: The app is blocked in the firewall structure of the Customer IT.

Solution: Customer IT must activate the app.

Adjusting the settings of the CS-52

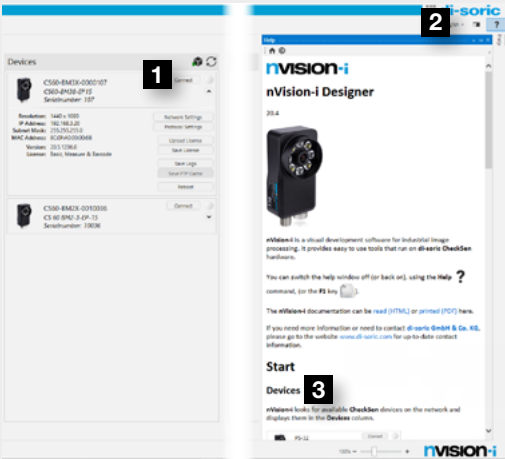


Fig. 02

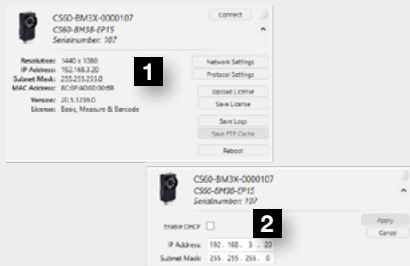


Fig. 03

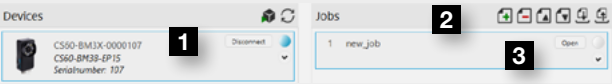


Fig. 04

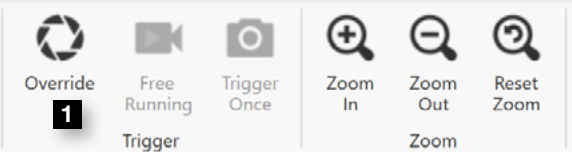


Fig. 05

After starting the nVision-i software, the following image appears: (Fig. 02)

- 1 Connect to Sensor
- 2 Help for selected action
- 3 Help with connection to sensor

Note:

In this window, adjustments to network settings, such as the assignment of the IP address or the activation of the industry protocols, can be performed right after the software has started. Click on "Apply" to save all changes. (Fig. 03)

- 1 Select Change IP
- 2 Set IP address to network

In the Devices area, a sensor or the emulator can be selected to establish a connection. A new job can then be created using "+" in the Jobs area. By clicking on "Open", inspections can be set up in the main menu. (Fig. 04)

- 1 Establish connection to sensor
- 2 Create new job
- 3 Open job

First select "Override" to put the sensor in editing mode. Click "Trigger Once" to record the first image. Next, you can begin with the image setup and focusing of the lens. (Fig. 05)

- 1 Adopt sensor control

Adjusting the focus

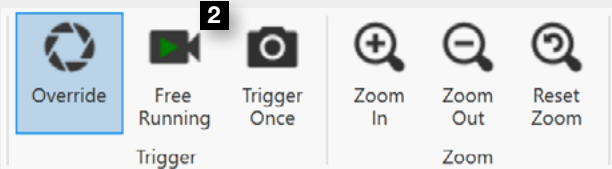


Fig. 06

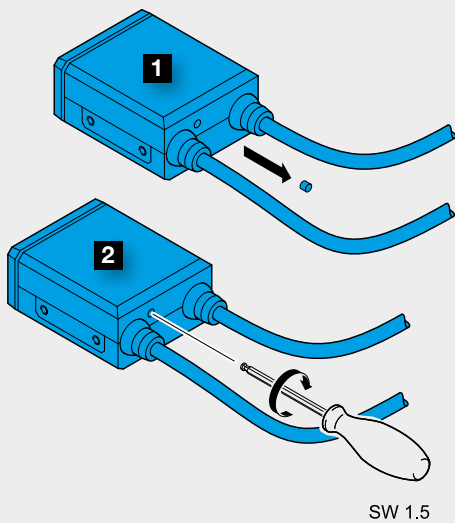


Fig. 07

To do this, continuous recording must be started via "Free Running". (Fig. 06)

2 Select Image Trigger

Mechanical focus adjustment

The focus is adjusted mechanically using an adjustment screw (Fig. 07).

1 Procedure:

1. Loosen the locking screw
2. Adjust the focus by turning
3. Secure the screw again without applying force

2 Direction of rotation:

- Clockwise: Focus closer to the sensor
- Counterclockwise: Focus further away from the sensor

Step-by-Step Focusing

1. Position the sensor at the desired working distance
2. Launch live view in the software (continuous)
3. Bring the object into the field of view
4. Set the focus roughly
5. Fine-tune the focus using edges and details
6. Optimize exposure
7. Set the focus

Practical tip: Always focus on the relevant inspection feature—not on the background.

After a new job has been created, the appropriate inspection tool for the task can be selected in the Menu area. To do this, click on the corresponding tool to add it in the Tool list area. It is also possible to add several tools to a job. (Fig. 08)

All configured jobs are saved locally on the CS-52. The Vision sensor thus works with or changes between jobs which are stored in its memory. But it is also possible to export these jobs to the computer or vice versa.



Fig. 08

THE IMAGE PROCESSING TOOLS

SIMPLE AND FAST

LOCALIZATION of areas, edges and shapes

AREA

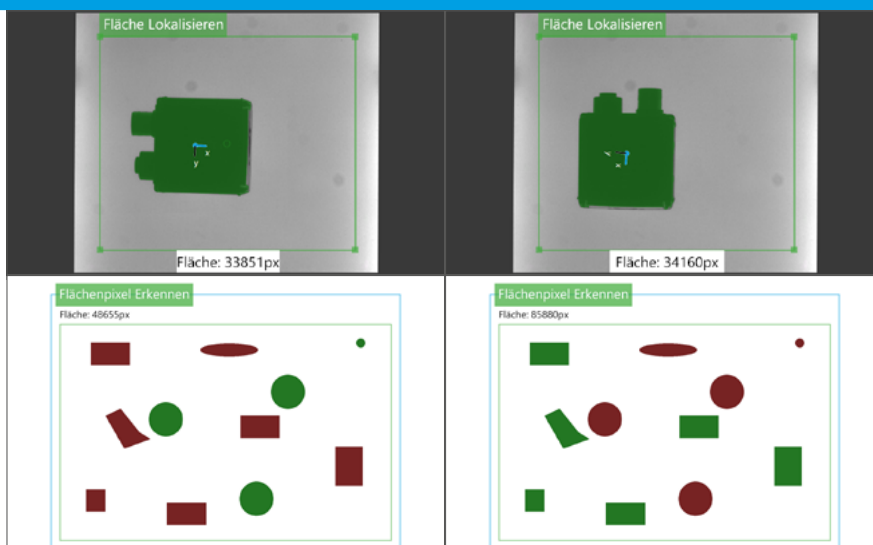
The tool "Localize area" is used in order to localize a part in a scene using Blob analysis.

Optional features provide a wide variety of results, such as the number of holes, the circumference and the shape of the area.

Filtering methods for the size and shape simplify job creation.

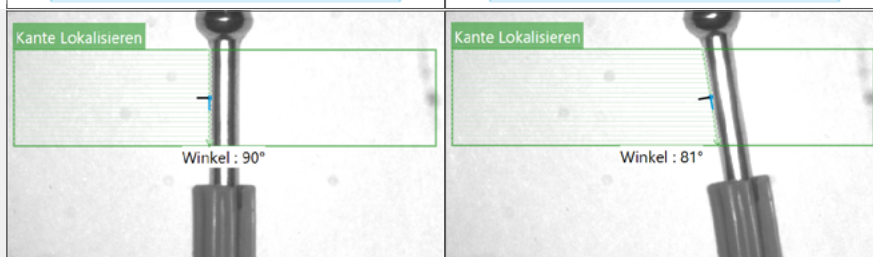
The same options and filters are in the "Counting" module.

The screenshots in the second row show results from filtering by shape.



EDGE

Finds an edge within the defined search field and serves as a guide for subsequent tools



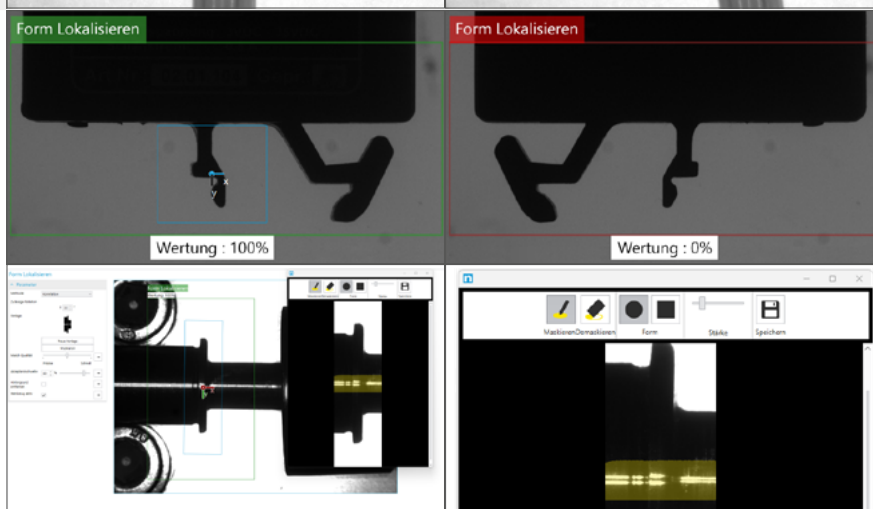
SHAPE

Compares learned patterns within the defined working area and also serves as position correction for subsequent tools.

Various methods, such as correlation (grayscale-based), geometric (edge-based), keypoint (calculated by software), result in the best possible image results.

The eraser function for removing interfering contours (row 2) simplifies definition of the test field.

The same methods and functions are also in the "counting" module.



DETECTION of the presence/absence of a feature based on pixel values and contrast

✓

BRIGHTNESS
Detects the average brightness as a function of the threshold range within a defined area in the image
Multi-ROIs substantially reduce the parameterization work

CONTRAST
Detects the contrast as a function of the threshold range within a defined area in the image
Multi-ROIs substantially reduce the parameterization work

AREA PIXELS
Detects the number of pixels as a function of the threshold range within a defined area in the image

EDGE PIXELS
Detects the number of edge pixels as a function of the threshold range within a defined area in the image

Helligkeit Erkennen
Ø Helligkeit : 2%

Helligkeit Erkennen
Ø Helligkeit : 95%

Kontrast Erkennen
Kontrast: 56%

Kontrast Erkennen
Kontrast: 13%

Flächenpixel Erkennen
Fläche : 2867px

Flächenpixel Erkennen
Fläche : 0px

Kantenpixel Erkennen
Fläche : 1921px

Kantenpixel Erkennen
Fläche : 3px

COUNTING of areas, edges and shapes

✓

AREAS
Determines the number of contiguous dark or bright regions
(see also "Localizing the area")

EDGES
Determines the number of edges along a line/search beam

SHAPES
Identifies and counts objects whose contour matches the learned contour
(see also "Localizing the shape")

Flächen Zählen
Anzahl : 9

Flächen Zählen
Anzahl : 8

Kanten Zählen
Anzahl : 10

Kanten Zählen
Anzahl : 8

Formen Zählen
Anzahl : 5

Formen Zählen
Anzahl : 5

NVISION-I

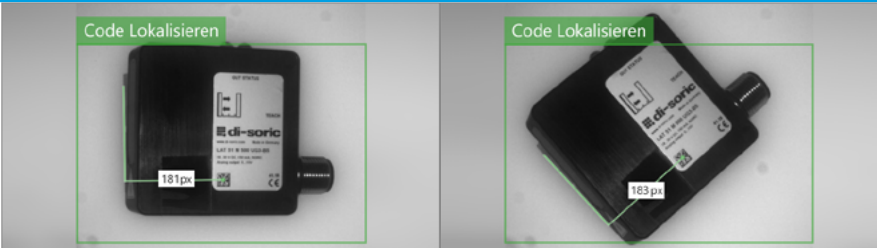
OPTIONAL UPGRADE MODULES

MEASUREMENT: Measurement of angles, diameters, circularity, distances and spacing in mm and pixels			
ANGLE Determines the angle of an edge			
CIRCLE Determines the diameter and circularity – down to the exact degree, e.g., for checking drill holes for breakouts or residue			
DISTANCE The slider determines the distance between 2 edges			
POINT-TO-POINT Measures the distance between 2 contour patterns, 2 circles or a mixture of points			
POINT-TO-LINE Measures the distance between a point (from blob, contour pattern, circle or edge) and a line/edge			

ID: Localizing, detecting and counting 1D, 2D and DM codes (standard for ID readers)

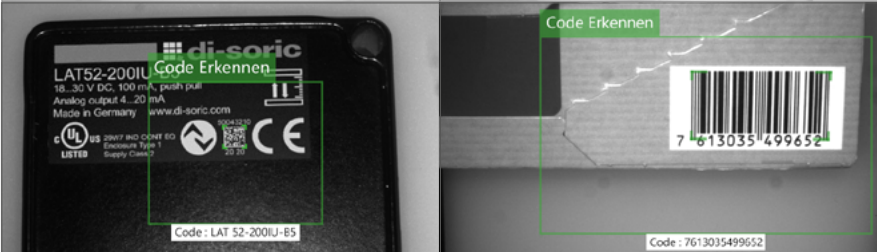
LOCALIZATION

Finds a code within the defined search field and serves as a guide for subsequent tools. Efficient in label fit check



DETECTION

Decodes all codes and can evaluate the content using different criteria (regular expressions)



COUNTING

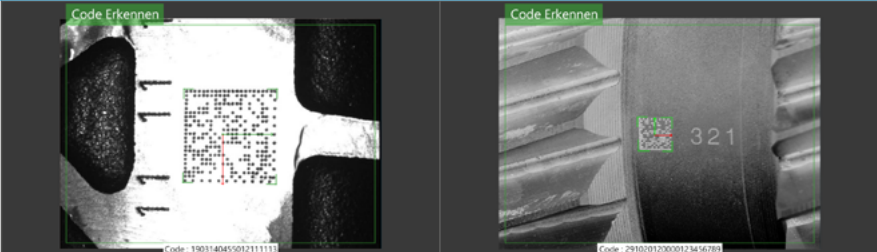
Enables simultaneous recognition of different codes



ID PRO: Detect hard-to-detect directly marked codes on difficult surfaces

DETECTING DPM CODES

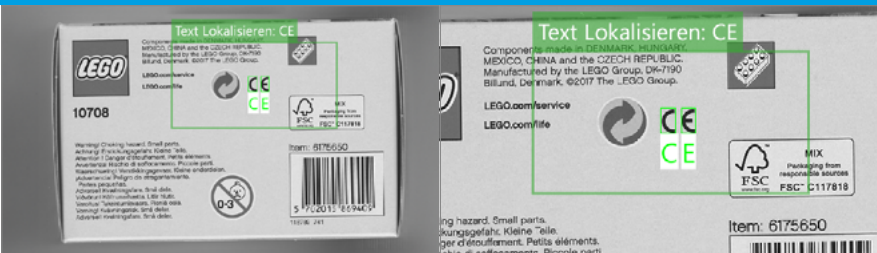
This upgrade enables high-performance reading of hard-to-read, directly marked codes on difficult surfaces and code grading



OCR: Localizing, detecting and counting characters (nVision-i Version 24.2 and later)

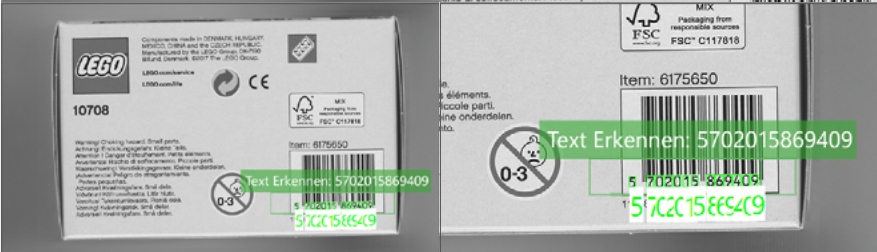
LOCALIZATION

Finds characters within the defined search field and serves as a guide for subsequent tools. Efficient in label fit check.



DETECTION

Finds characters and can evaluate the content using different criteria (regular expressions)



COUNTING

Counts the number of different characters in the search field



OCV: Verification of recognized characters for accuracy, complete legibility and expected quality (starting with nVision-i V26.1)

USER INTERFACE

Structure of the user interface

The nVision-i user interface is made up of 4 areas. The navigation bar in the upper area is for instructions and setup. The inspection tools contained here are divided into 4 groups. Double-click on one of these tools to insert it in the area on the left, the so-called pipeline. Configuration and parameterization of the selected tools can be performed in the area in the middle. Finally, on the right side there is an even larger field in which the image and the drawing tools are displayed.

A Navigation bar & inspection tools:

- Intuitive and user-friendly navigation menu.
- Contextual help can be displayed as needed.
- Menu guidance available in 4 languages.

B Pipeline & status checks:

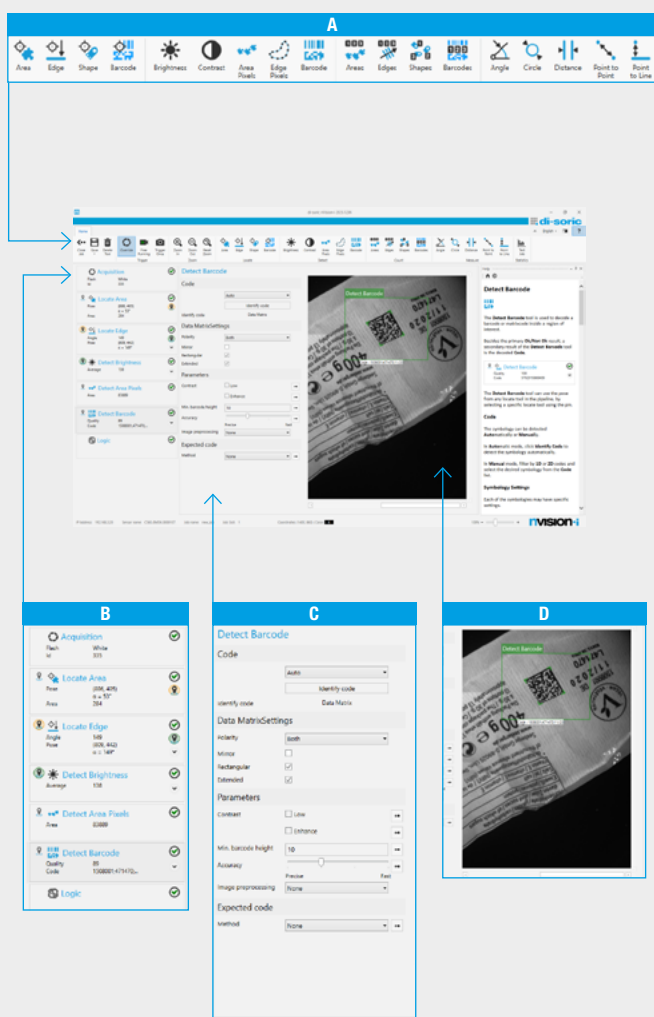
- Inspection tools can be inserted here via drag & drop. Measured values and test results/status are shown here.

C Configuration:

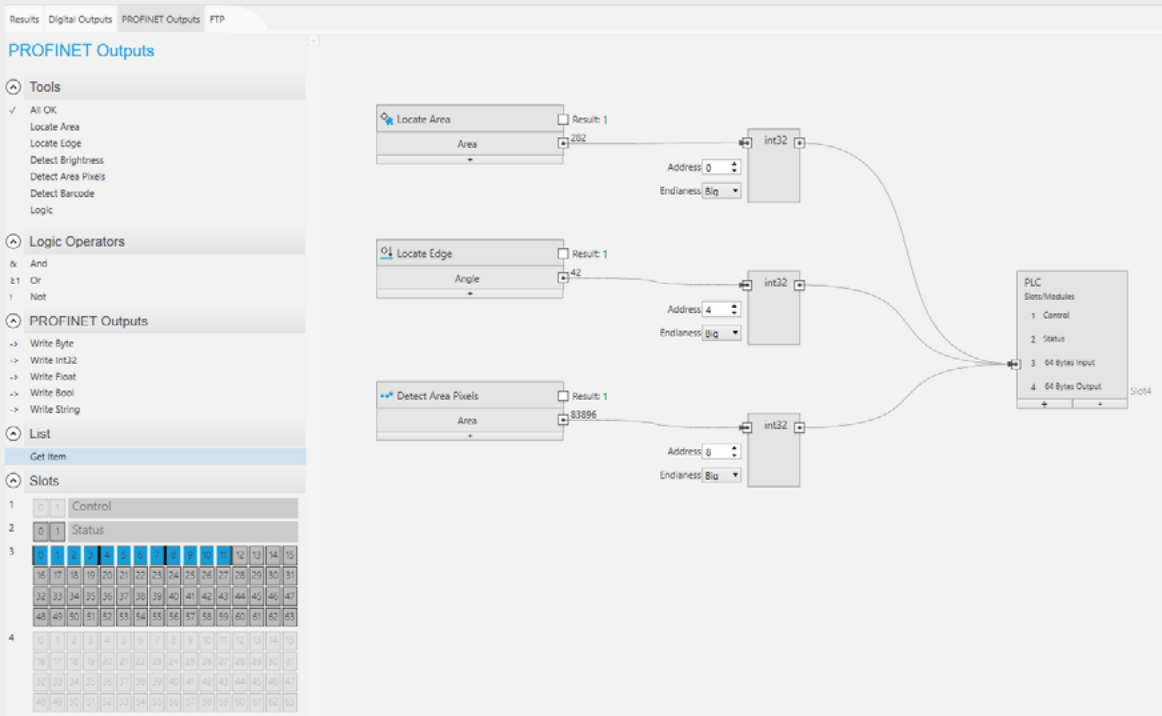
- Parameters for search criteria can be adjusted simply and directly.
- Limit values for the evaluation criteria can be entered easily.

D Display & Drawing tools:

- Image viewing for checking and analysis during operation.

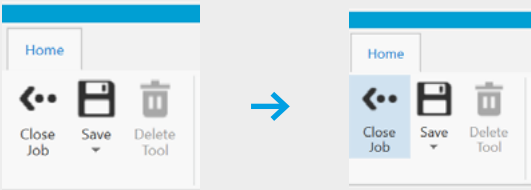


Communication with higher-level control systems



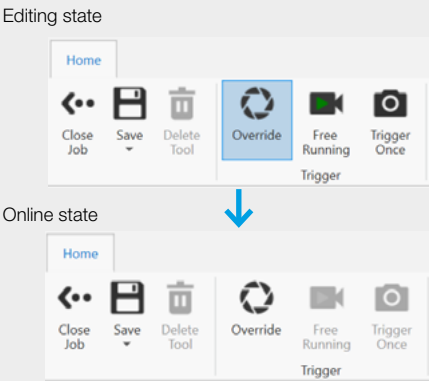
At the end of editing, the results can be summarized and transmitted to the higher-level control system using the options in the Logic area.

Saving the job



Save the job in the flash memory of the sensor by clicking "Save job". Return to the starting view with "Close job".

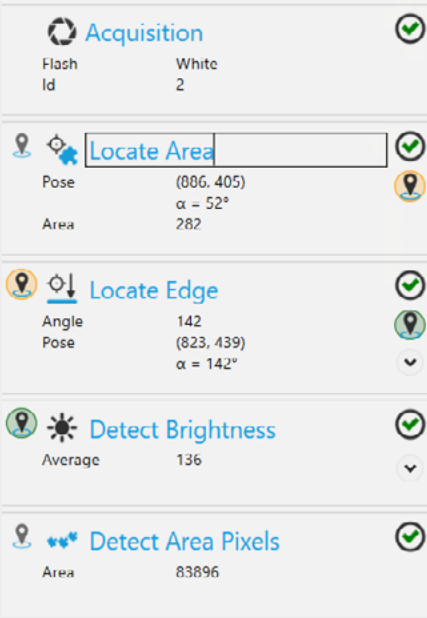
Executing the job



Select "Override" to execute a job. Now the sensor is active and ready to communicate with the higher-level control system.

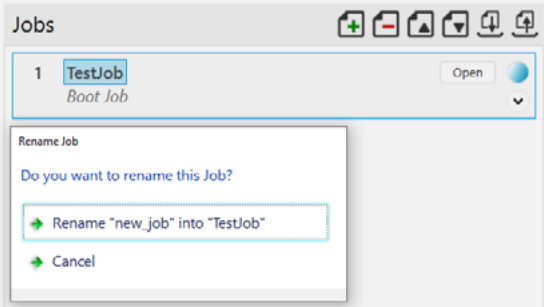
APPENDICES

Renaming inspection tools



Click on the name field to select and rename it.

Renaming a job name



To do this, click on the corresponding name field and rename it.

Setting a boot job

Jobs     

1	Example_PN_FTP_TXT_1235 <i>Boot Job</i>	Open 
Created: 2/3/1970 5:08:38 AM Modified: 9/21/2020 11:17:24 AM		Active Job Boot Job

2	Example_PN_FTP_TXT_1235	Open 
Created: 2/3/1970 5:07:09 AM Modified: 2/3/1970 5:07:09 AM		Active Job Boot Job

First click on the arrow and then on "Boot job".

Importing and exporting the job

Jobs     

1	Example_PN_FTP_TXT_1235 <i>Boot Job</i>	Open 
Created: 2/3/1970 5:08:38 AM Modified: 9/21/2020 11:17:24 AM		Active Job Boot Job

2	Example_PN_FTP_TXT_1235	Open 
Created: 2/3/1970 5:07:09 AM Modified: 2/3/1970 5:07:09 AM		Active Job Boot Job

Click on the corresponding arrow.

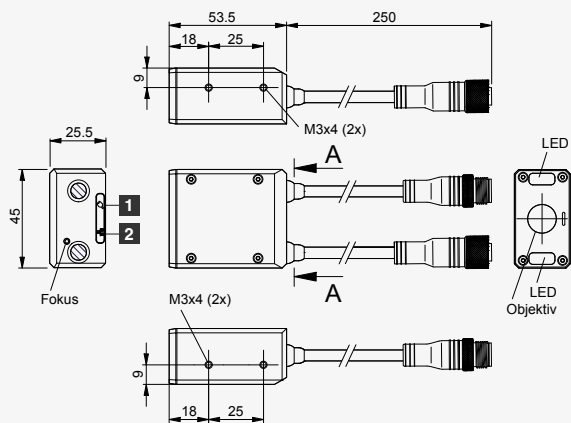
CS-52 VISION SENSOR

TECHNICAL DATA

- Fixed S-mount lens (3.6 mm / 8 mm / 16 mm / 25 mm) with variable focus
- Built-in white LED lighting
- Ultra-compact design
- Protection class IP50



Design / connection information



- 1 LED 1: Green - Operation, Red - Signal Digital Input
- 2 LED 2: Green - DATA-Link, Red - Ethernet signal

12-pol A-coded	
1 NC	7 Power (21-28V)
2 Digital IN1	8 GND
3 Digital Out2	9 NC
4 NC	10 Trigger (Digital IN0)
5 READY (Digital Out3)	11 Digital OUT0
6 NC	12 Digital OUT1

8-pol X-coded	
1 LAN A+	5 LAN D+
2 LAN A-	6 LAN D-
3 LAN B+	7 LAN C-
4 LAN B-	8 LAN C+



WARNING! The device is not a safety component pursuant to 2006/42/EC and EN 61496-1/-2. The device may not be used for personal protection! Non-compliance can lead to death or serious injury! The device may only be used for the intended purpose!

Software requirements

The nVision-i software can be run on the following operating systems:

- -Microsoft Windows 7 (64-bit), SP1
- -Microsoft Windows 10 (64-bit)
- -Microsoft Windows 11 (64-bit)

Minimum computer requirements:

- Intel® Core™ i3 Processor @1.6GHz
- 2GB RAM (Windows 7 SP1 / Windows 7 Embedded Standard SP1)
- 3GB of hard drive space
- 32-bit color display, 1366x768 or 1280x960
- 4.0 Windows Experience Index (particularly for graphics)
- 1 USB 2.0 port and 1 network port

Recommended computer requirements:

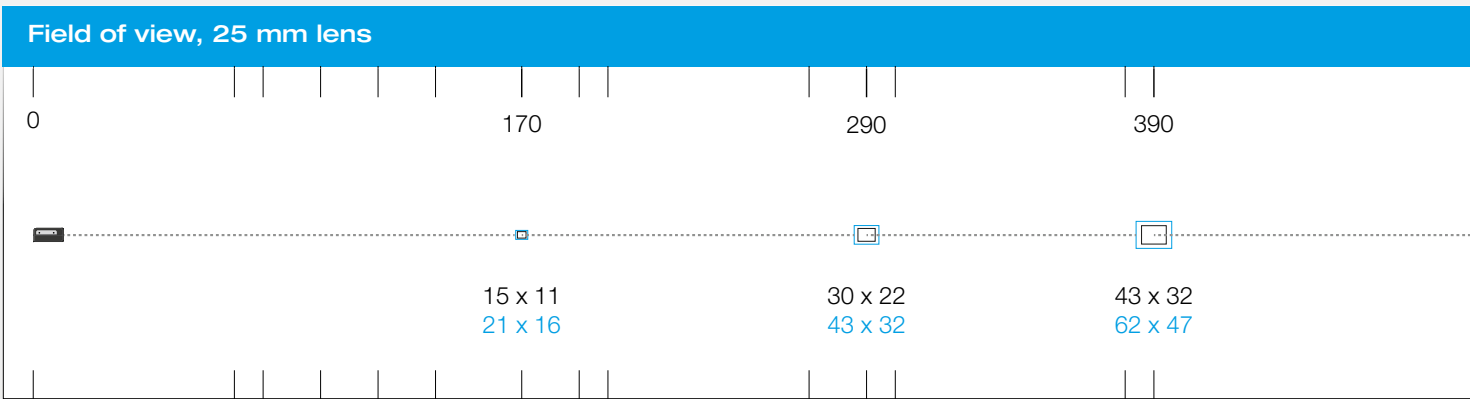
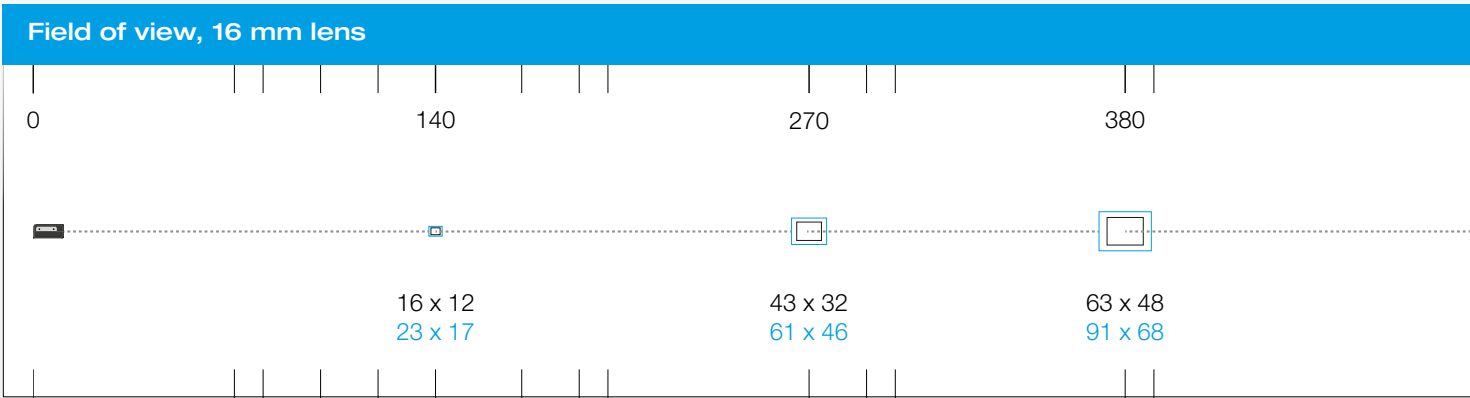
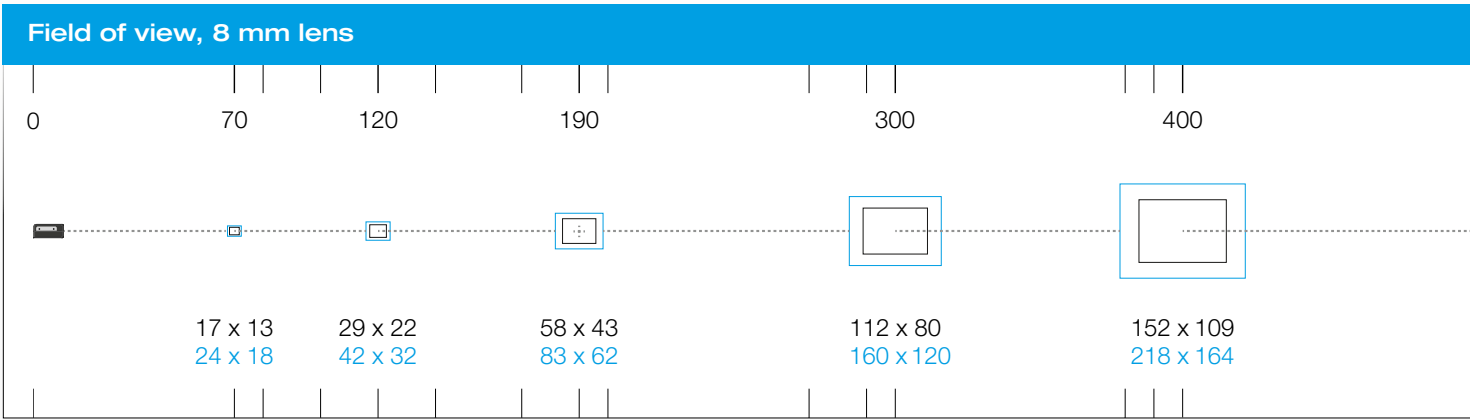
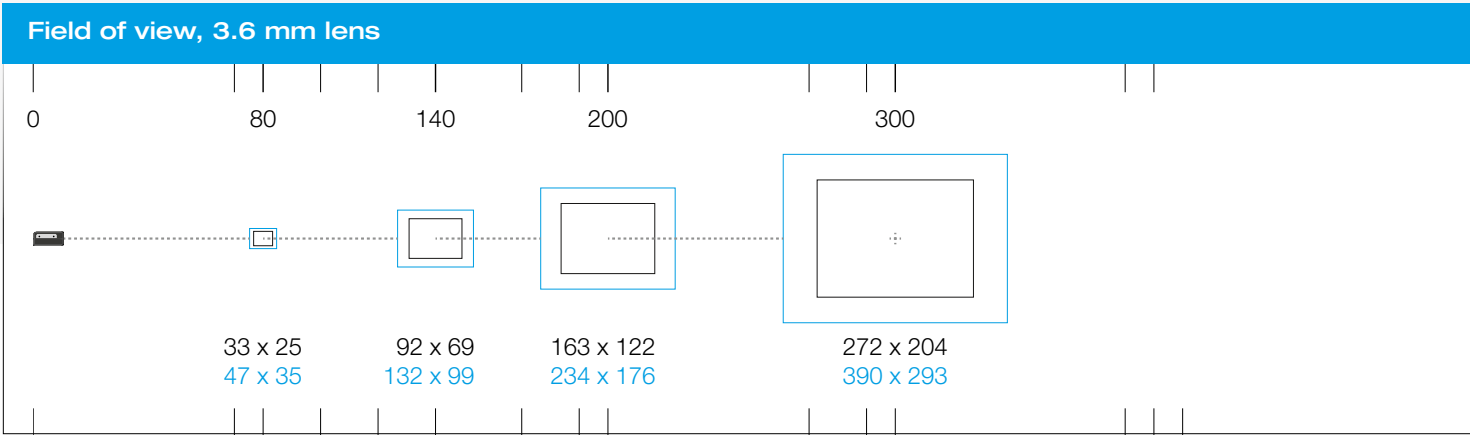
- Intel® Core™ i7 Processor @ 2.0GHz
- Internet Explorer 11 / Google Chrome
- 8GB RAM (Windows 7 SP1)
- 10GB of hard drive space
- 32-bit color display, 1920x1080
- 5.0 or greater Windows Experience Index
- 1 USB 2.0 port and 1 Gigabit Network port (Intel Chipset recommended)

Resolution CS52-BMXY	3Y: 1440 (H) x 1080 (V) 4Y: 2064 (H) X 1552(V)	
Focal length CS52-BMXY	X3: 3.6 mm X8: 8 mm X16: 16 mm X25: 25 mm	
	CS52-BMXY - EP5/300	CS52-BMXY - EP5/300ID
	CS52-BMXY - EP5/300ID/OCR	CS52-BMXY - EP5/400
	CS52-BMXY - EP5/400ID	CS52-BMXY - EP5/400ID/OCR
	CS52-BMXY - EP5/500	CS52-BMXY - EP5/500ID
	CS52-BMXY - EP15/500ID/OCR	
Included modules		
■ Localization	■	■
■ Part recognition	■	■
■ Counting	■	■
■ Measuring		
■ ID (reading 1D/2D/DPM codes)		■
■ OCR (character recognition)		■
■ Smart tool (nVision-i Release 25.1 and later)		■
Upgrade modules:		
■ Measuring	■	■
■ ID (reading 1D/2D/DPM codes)	■	■
■ ID Pro (ID upgrade*) • Reading difficult DPM codes • Code grading (based on ISO 15415)	■	■
■ OCR (character recognition)	■	■
■ OCV (Character verification*, starting with nVision-i 26.1)	■	■
■ Smart tool (nVision-i Release 25.1 and later)	■	■
■ Customization	■	■
Pixel size (µm)	2.25 µm (H) × 2.25 µm (V)	
Shutter	global	
Max. image frequency (fps)	40 fps	
Processor	Quad core	
Processing speed	4x	
Scope of delivery	CS52 Vision sensor, Allen wrench for focus adjustment	
Housing dimensions H/W/D	25/45/53.7 mm	
Cable length	2 x pigtail 250 mm	
Service voltage	21 to 28 VDC	
Working distance (from the rear edge of the device)	70 – 980 mm	
Internal lighting	4x LED white	
Flash memory/number of jobs	16 GB/to 255	
Focusing	Adjustable focus via a set screw on the back	
Interfaces & protocols	Digital I/O, TCP/IP, Profinet, Ethernet/IP	
Digital inputs/outputs	2 (including Trigger) / 4 (including Ready)	
Image storage	Via FTP/manually in the software	
Protection class	IP50	

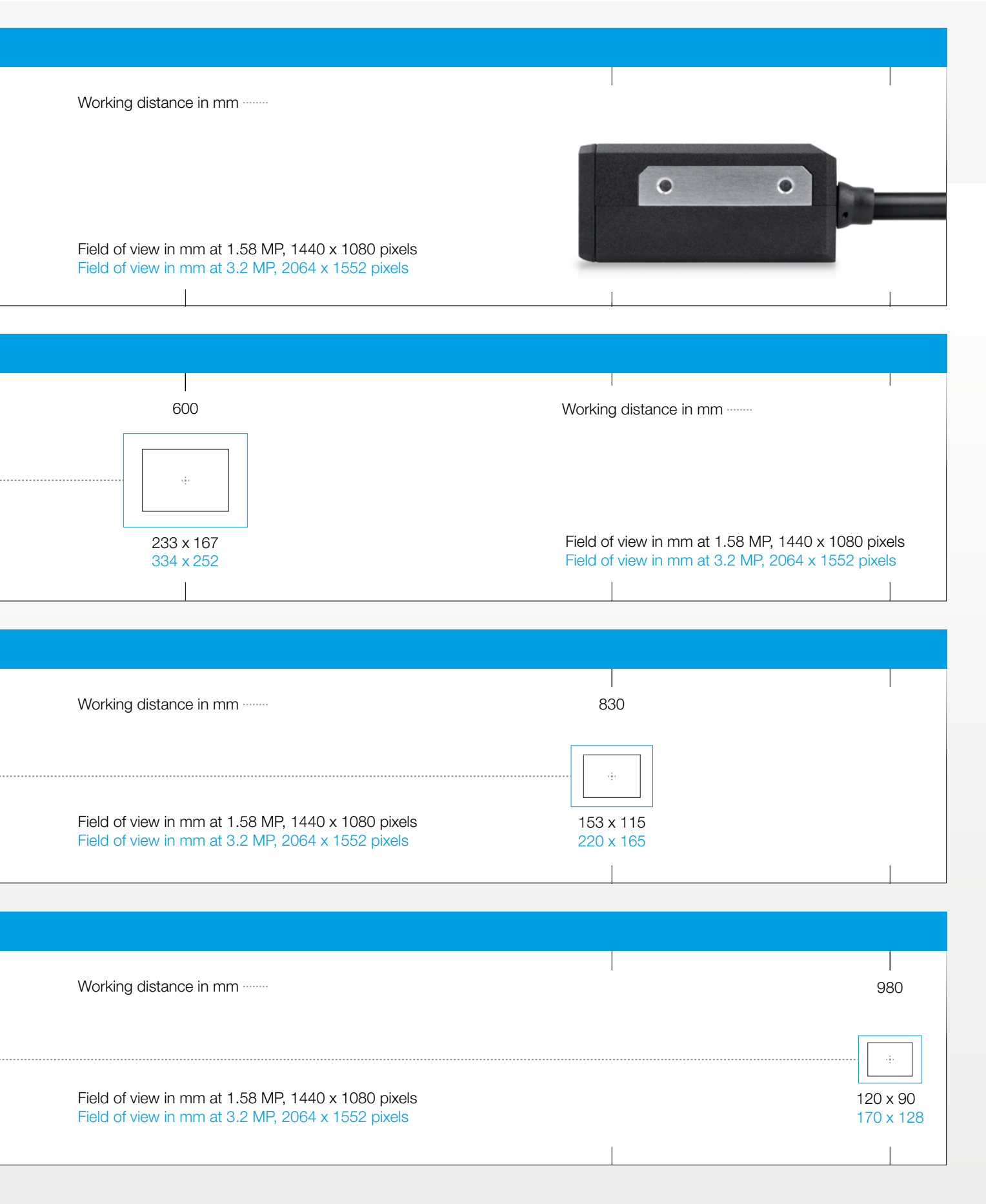
* The ID Pro upgrade only works with an existing ID license; the OCV upgrade only works with an existing OCR license.

FIELDS OF VIEW

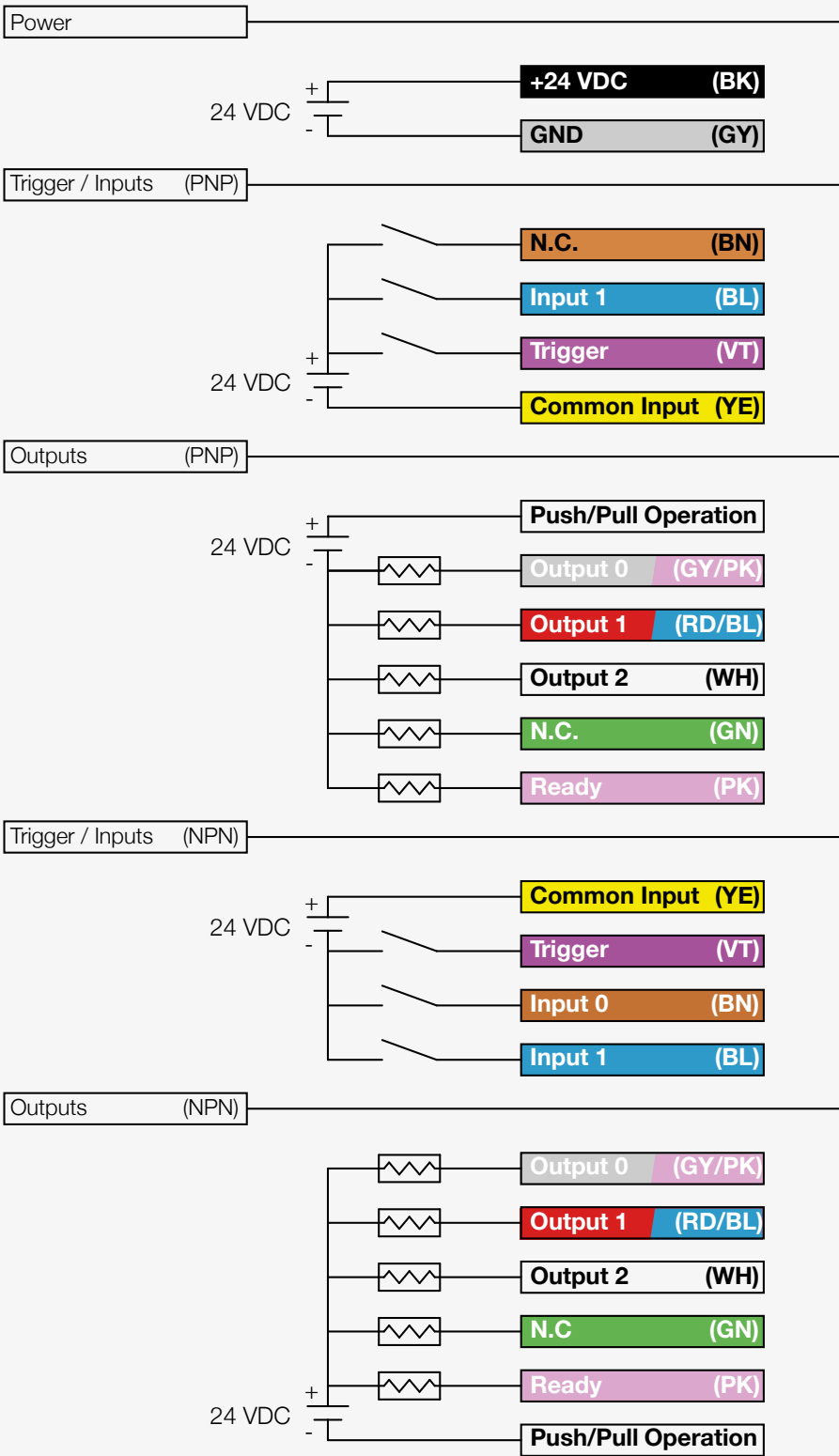
CS-52



The tables show the representation of fields of view with the available lenses at various working distances for our Vision sensors-and fixed-mounted ID readers with 1440 x 1080 pixels (1.58 MP) and 2064 x 1552 pixels (3.2 MP). Working distance: Back edge sensor to worktop.
Depth of sensor: 53.70 mm.



DIO wiring diagram



HMI recommendation

The nVision-i software comes pre-installed on the following Windows-based panels upon delivery. This enables a complete set-up of the CS-52 family as well as visualization via commonly used browsers such as Google Chrome, Firefox or Edge.

ARCHMI-912ARH74600-DIC	(12 inch, resistive display)
ARCHMI-912APH74600-DIC	(12 inch, capacitive display)
ARCHMI-915ARH74600-DIC	(15 inch, resistive display)
ARCHMI-915APH74600-DIC	(12 inch, capacitive display)

The following panels can only be used for visualization purposes via an automation browser.
Android 10 is used as the operating system. The following types are available for selection:

JWS101-A210-3288432KY-A	(10 inch, capacitive display, automation browser, Android 10.0)
JWS121-A210-3288432KY-A	(12 inch, capacitive display, automation browser, Android 10.0)
JWS121-A210-3288432KY-A	(15 inch, capacitive display, automation browser, Android 10.0)

For information about prices and delivery times, please contact the company Wachendorff directly via the following contact info:

Andreas Weible, Head of D-South-West sales region

Mobile phone: +49 1 51 / 180 118 45

Phone: +49 71 25 / 9698 847

Email: awe@wachendorff.de

SOLUTIONS. CLEVER. PRACTICAL.

di-soric Headquarters

Germany: di-soric GmbH & Co. KG | Steinbeisstrasse 6 | 73660 Urbach
Phone +49 71 81 98 79-0 | Fax +49 71 81 98 79-179 | info@di-soric.com

di-soric Subsidiaries

Austria: di-soric GmbH & Co. KG | Phone +43 7228 72 366 | info.at@di-soric.com

China: di-soric Industrial Automation (Suzhou) Co. Ltd. | Phone +86 189 1374 8271 | info@di-soric.cn

France: di-soric SAS | Phone +33 476 61 65 90 | info.fr@di-soric.com

Singapore: di-soric Pte. Ltd. | Phone +65 6694 7866 | info.sg@di-soric.com

For further information visit www.di-soric.com/international

www.di-soric.com